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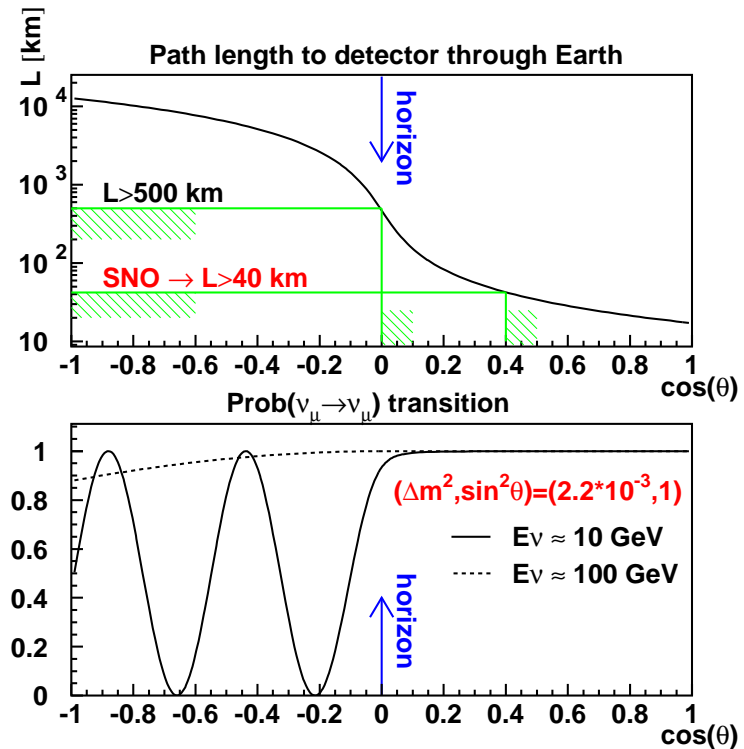
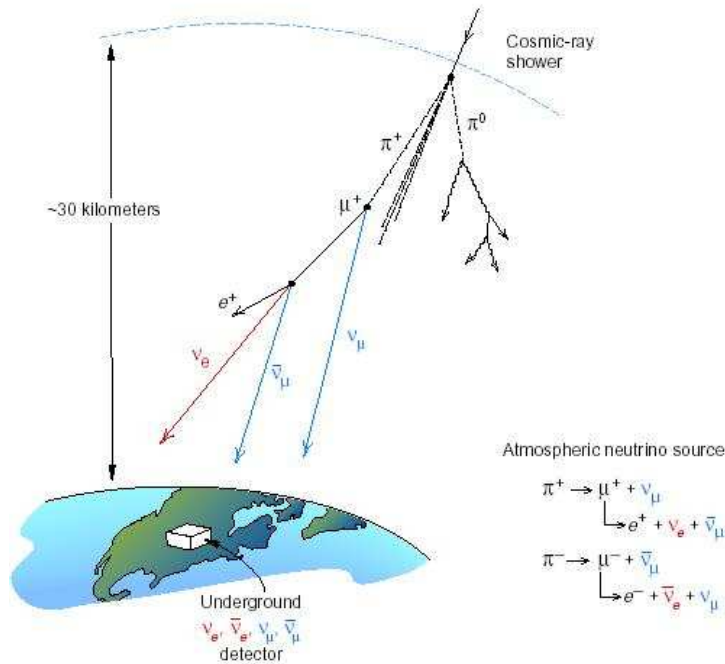
Charles Currat
LBNL

July 14, 2004

- ◆ Atmospheric neutrinos studies in SNO

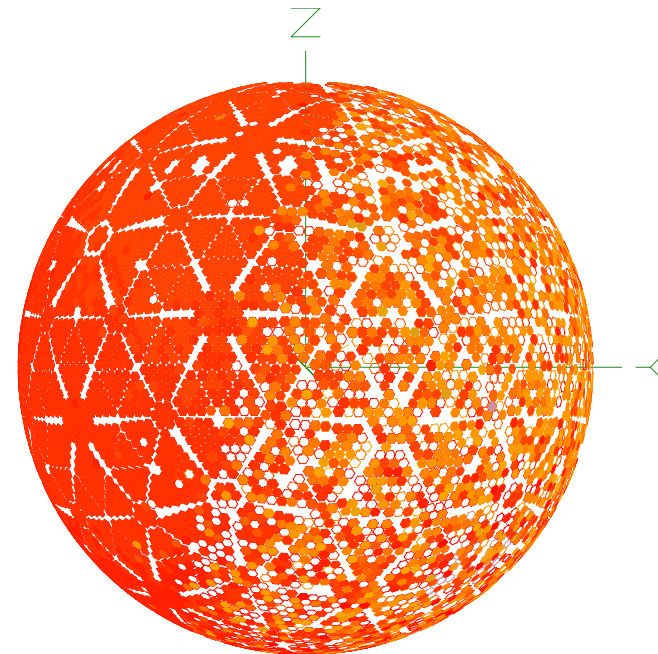
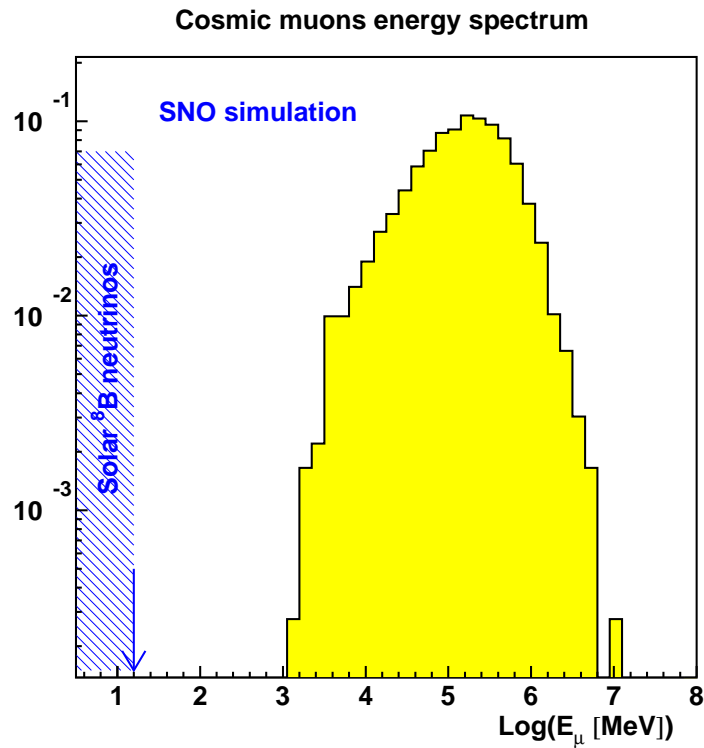
Atmospheric neutrinos in SNO

Challenging for SNO since volume is much smaller than SuperK: 2.7 kton vs 22 kton fiducial (50 kton total). But at its depth SNO is in a unique position amongst underground detectors.



Muons in SNO

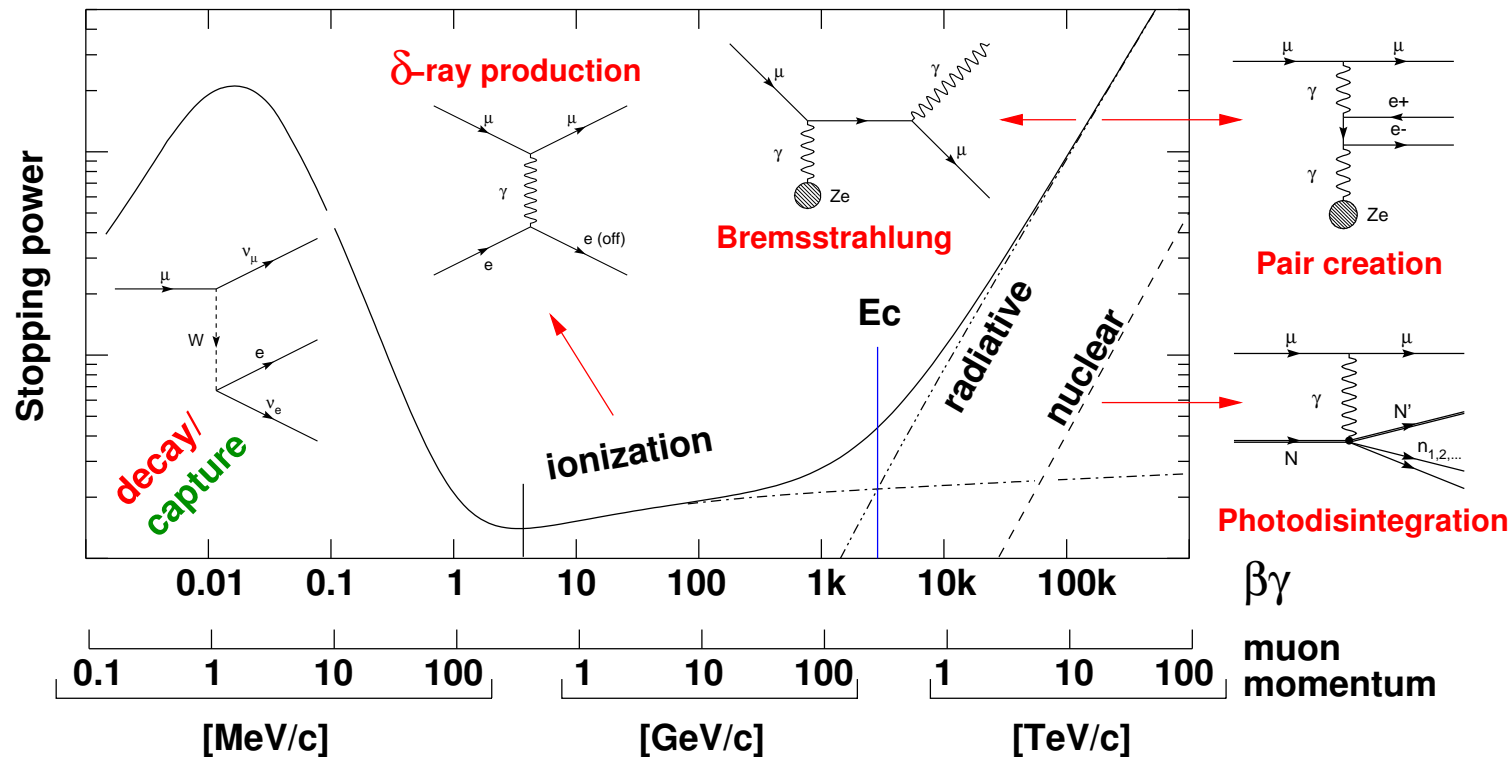
We want to measure through-going muons ($E_\mu > 10$ GeV). 3D-track reconstruction uses PMTs timing.



Run: 1 GTID: 33

Software side

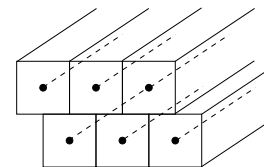
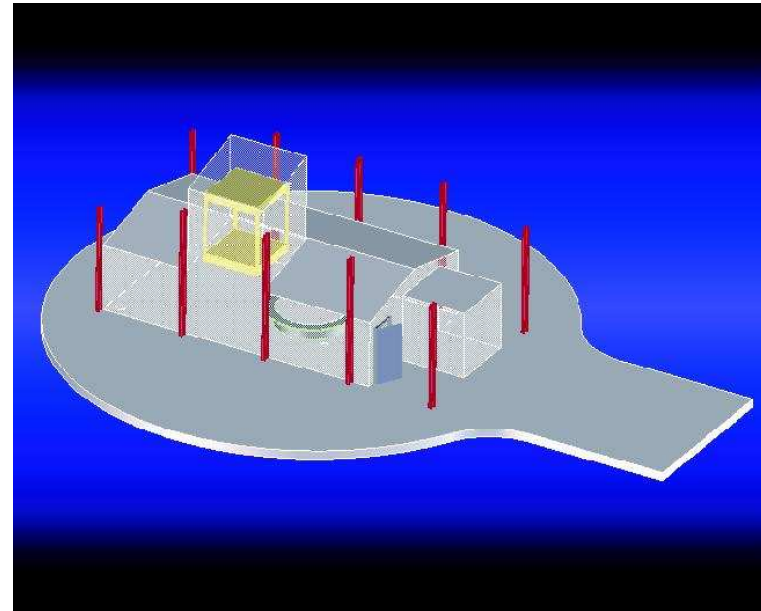
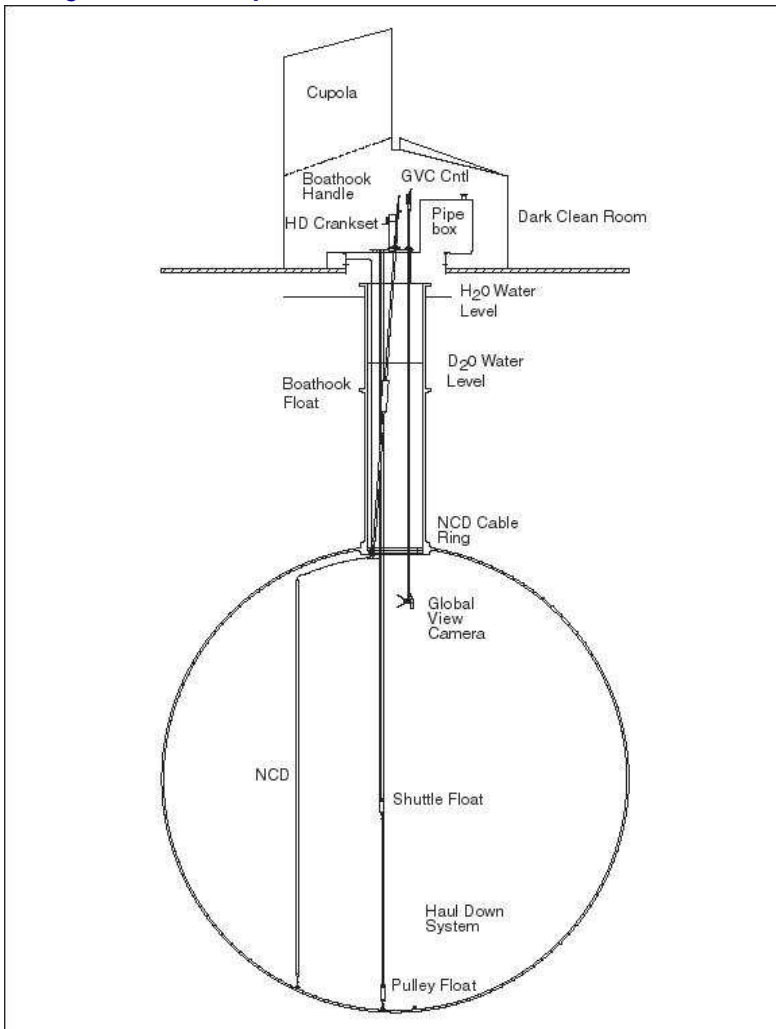
Important effort on muons simulation in SNO Monte Carlo.



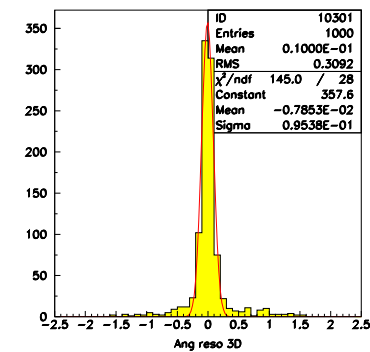
➡ From $O(10 \text{ TeV})$ down to explicit thermalization of spallation products (neutron $1/40 \text{ eV}$) the same data structure accomodates 15 orders of magnitude in energy!!

Hardware side

Project: independent calibration of muons with tracking chambers.



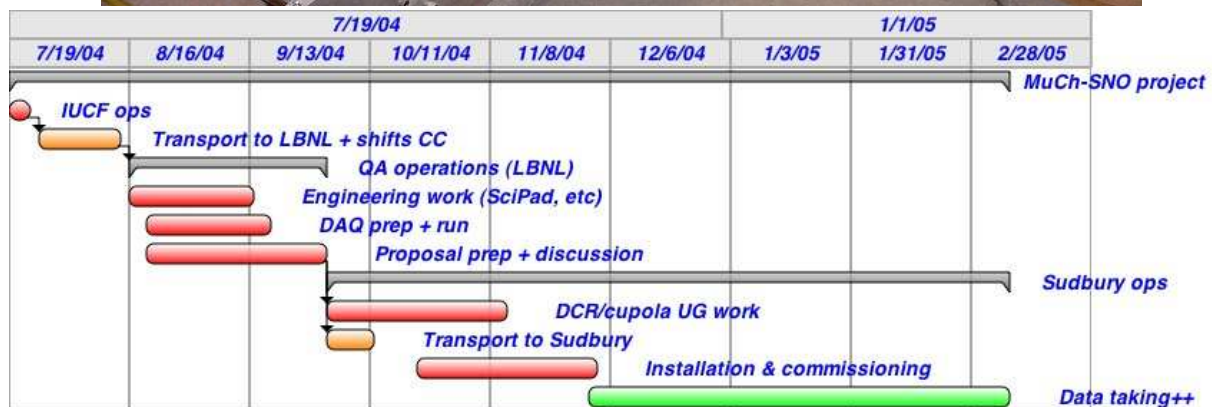
Cell size: 7.5 cm x 7.5 cm
 Longitudinal resolution: 5 mm
 Transverse resolution: 500 microns
 Stations: 2, 2 layers each, 2 m apart





Chambers

We found chambers used for HEP test beams (FNAL/IUCF/JLab). Some engineering work required for SNO needs (scintillator pads, support structure).

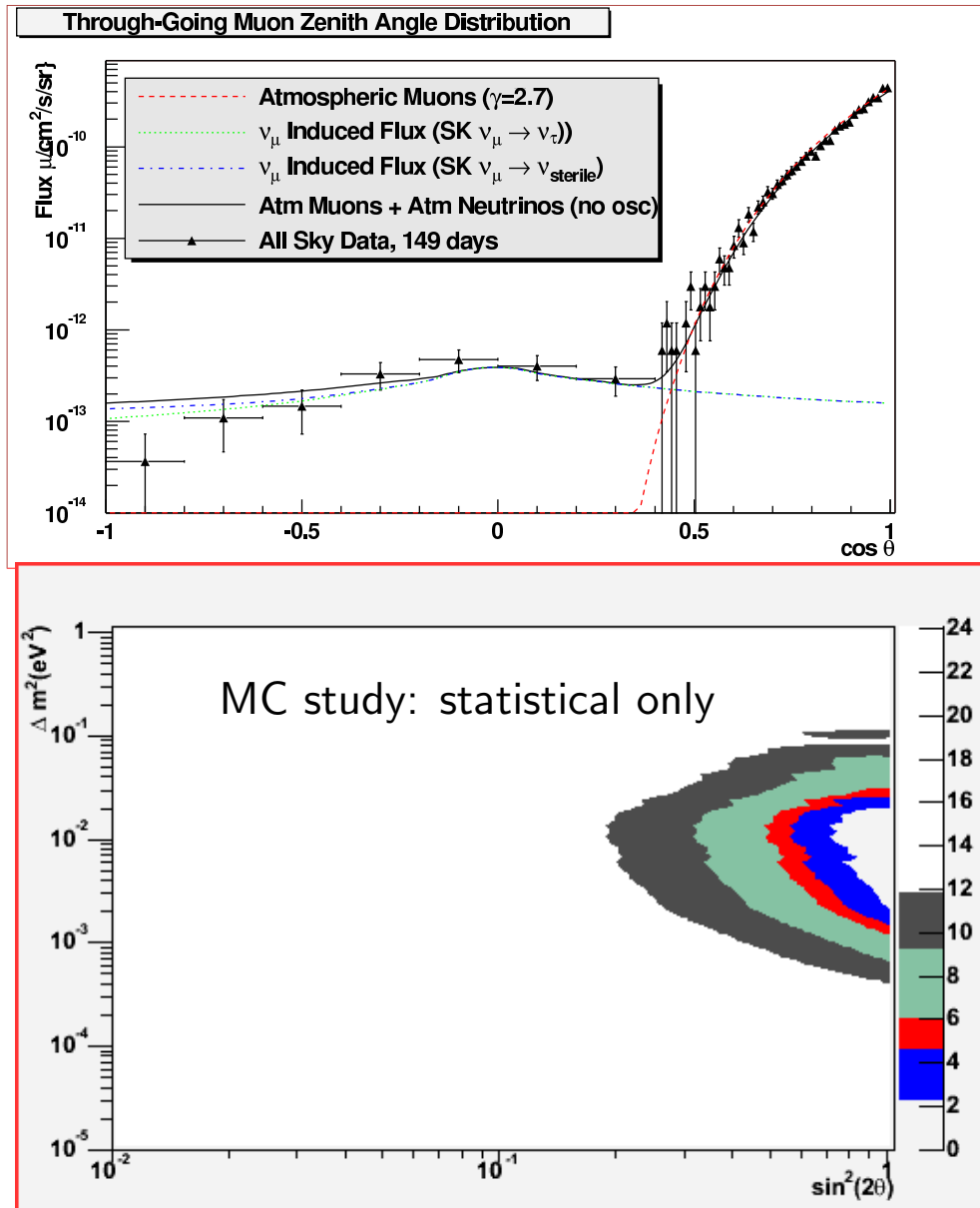




Atmospheric neutrinos in SNO



Preliminary analysis with 150 days of data (courtesy of N. Tagg) Perspective at SNO with 730 days of data (probably over 800 days available, ultimately $\sim \times 2$)



👉 stop/thru analysis à la SuperK under investigation (bin over horizon)